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EXAMINER	
ROSARIO VASQUEZ, DENNIS	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/800,638	ATKINS ET AL.	
	Examiner	Art Unit	
	Dennis Rosario-Vasquez	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment was entered on September 28, 2004. Claims 1-20 are pending.

Response to Arguments

2. Applicant's arguments filed September 28, 2004 in the amendment on pages 8 and 9 with respect to claim 1 have been fully considered but they are not persuasive.

The amendment states on page 9, "Vehvilainen does not teach "generating a filter identifier based on one of edge parameter...," as recited in Claim 1.".

However, Vehvilainen does teach generating a filter identifier ("branches" are used for "classification" for a "filter" in col. 10, lines 1-5. Note that the branches correspond to yes/no decision diamonds of fig. 6,numerals 66,70 and 74.) based on one of edge parameter ($activity_{EDGE}$ of equation (2) is used with the branches for classification in col. 10, lines 5-7.).

3. Applicant's arguments filed September 28, 2004 in the amendment on pages 9,10 with respect to claims 1 and 8 have been fully considered but they are not persuasive.

The amendment states on page 9, "Vehvilainen does not teach "for each input pixel associated with the digital image,".

However, Vehvilainen does teach "for each input pixel (X_{max} is the largest one of the pixel values in col. 10, line 51.) associated with the digital image (Fig. 5A represents a digital image with a pixel that represents the largest pixel value X_{max} from the other pixel values.)

4. Applicant's arguments filed September 28, 2004 in the amendment on pages10, 11 with respect to claim 15 have been fully considered but they are not persuasive.

The amendment states that Vehvilainen does not teach various limitations of claim 15. However, Vehvilainen does teach the various limitations of claim 15 as discussed below.

5. Applicant's arguments filed September 28, 2004 in the amendment on pages 11 and 12 with respect to claim 18 have been fully considered but they are not persuasive as discussed below.

Claim Objections

6. The following quotations of 37 CFR § 1.75(a) is the basis of objection:

> (a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

7. Claim 15 is objected to under 37 CFR § 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery.

8. Claim 15,line 18: “the current input pixel” has no antecedent basis. Is “the current input pixel” referring to “for each input pixel” in line 4 of claim 15?

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-17,19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Vehvilainen (US Patent 6,504,873 B1).

Regarding claim 1, Vehvilainen discloses an image processing system comprising:

a) a filter selection mechanism (Fig. 6 is a program that performs a selection of filters of a computer shown in fig. 7, num. 93:FIL. Note that a selection is performed using "branch selection" in col. 10, line 5.) for receiving an input pixel window (Fig. 5A, label: "Block N" is a block of pixels that is received in fig. 6, num. 60:START NEW FRAME.) and responsive thereto (Fig. 5A, label: "Block N") for generating a filter identifier ("branches" represented by arrows in figure 6 are used for "classification" for a "filter" operation of fig. 6 in col. 10, lines 1-5 based on activity_{EDGE} in col. 11, lines 43-50. Note that braches corresponds to the claimed "identifier" since the branches perform a classification.) based on one of

a1) an edge parameter evaluation unit (An edge paramemter activity$_{EDGE}$ of equation (2) is used with the branches for classification in col. 10, lines 5-7 and the classification is evaluated in fig. 6, num. 66: "FILTERING?".) computed (The edge parameter activity$_{EDGE}$ is computed based on Block N or "adjacent blocks" in col. 9, lines 62,63.) based on the input pixel window (Fig. 5A, label: "Block N" is a block that is adjacent to Block N+1 of fig. 5A.); and

a2) an activity metric computed based on the input pixel window; and

b) a filter application unit (Fig. 7, num. 93:FIL is a filter.) coupled (via a an arrow in fig. 7 between decoder 92:DEC and filter,93:FIL) to the filter selection mechanism (Fig. 6 is a program that performs a selection of filters and is executed in the decoder 92:DEC of fig. 7 in col. 11, lines 7-10.) for receiving the filter identifier ("branches" are used for "classification" for generating a classification or identifier of data to be received by a "filter" in col. 10, lines 1-5.) and applying a filter (Fig. 7, num. 93:FIL is a filter.) identified by the filter identifier ("branches" are used for "classification" for generating a classification or identifier of data to be received by a "filter" in col. 10, lines 1-5.) to the input pixel window (Fig. 5A, label: "Block N") to generate an output pixel (Fig. 7,num. 95 is a display that generates a video picture in col. 11, line 22.).

Claims 2 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 2.

Regarding claim 3, Vehvilainen discloses the image processing system of claim 2 wherein the edge parameter (An edge paramemter $activity_{EDGE}$ is computed using a variance formula in col. 9, lines 62 and 63 and the variance is discussed in col. 10, lines 32-67.) is one of an edge angle, an edge sharpness, an edge curvature (Fig. 2B shows an edge curvature), and any measurable unit related to an edge (Edge variance is measured in col. 10, lines 57,58.).

Claims 4 and 5 are rejected under the "one of" limitation.

Regarding claim 6, Vehvilainen discloses the image processing system of claim 1 wherein the filter application unit (Fig. 7, num. 93:FIL is a filter.) includes a filter repository for providing a plurality of filters (The filter of fig. 7,num. 93 can be "adjusted" to filter differently in col. 10, line 4.) for use by the filter application unit.

Regarding claim 7, Vehvilainen discloses the image processing system of claim 6 wherein the filter repository (The filter of fig. 7,num. 93 can be "adjusted" via a program shown in fig. 6 to filter differently in col. 10, line 4.) includes one of a blurring filter, a smoothing filter (The filter of fig. 7, num. 93 can be adjusted using fig. 6, num. 80:FILTER SMOOTHLY.), a sharpening filter, and an enhancement filter.

Claim 8 is similar to claim 1 except for the limitation of:

for each input pixel (Fig. 5A has a block of input pixels.) associated with the digital image (The block of pixels represents an image.):

a) receiving an input pixel window (Fig. 5A, label: BLOCK N is a block of pixels that is received by the program of fig. 6.) corresponding to a current input pixel ("$x_{max}$is the largest one of numerical values of video pixels inside the picture area [or BLOCK N] under examination (col. 10, line 51)".)

Regarding claim 9, Vehvilainen discloses the method of claim 8 wherein the step of receiving an the input pixel window (Fig. 5A, label: BLOCK N is a block of pixels that is received by the program of fig. 6.) corresponding to the current input pixel (X_{max}) includes the step of:

receiving an the input pixel window (Fig. 5A, label: BLOCK N that includes the current input pixel (X_{max}) and pixels ("X_{min} is the smallest one of numerical values of video pixels inside the picture area [or BLOCK N] under examination.) adjacent (X_{min} and x_{max} pixels in Block N of figure 5A can be adjacent if they happen to be the smallest and largest pixel value, respectively.) to the current input pixel (X_{max}).

Regarding claim 10, Vehvilainen discloses the method of claim 8 wherein the step of receiving an the input pixel window corresponding to the current input pixel includes the step of:

a) receiving an the input pixel window (Fig. 5A, label: BLOCK N) that includes a N x N square of pixels(Fig. 5A,num. 51 is a square of pixels.) centered about the current input pixel (The window, Block N may be centered about the current pixel X_{max} if the current pixel X_{max} happens by chance to be the largest pixel value at the center of Block N.)

Claim 11 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 11..

Claim 12 is rejected the same as claim 3. Thus, argument similar to that presented above for claim 3 is equally applicable to claim 12.

Regarding claim 13, Vehvilainen discloses the method of claim 8 wherein the step of generating the filter identifier based on one of an edge parameter and an activity metric includes the steps of:

a) computing (Equation (5) in col. 10 computes an edge variance or metric in col. 9, line 63 and col. 10, lines 57-59.) an the activity metric ($activity_{EDGE}$) based on the input pixel window (Fig. 5A, label: BLOCK N); and

b) using the activity metric (The activity metric, $activity_{EDGE}$, is used with the branches in col. 10, lines 15-17.) to generate the filter identifier ("branches" represented by arrows in figure 6 are used for "classification" for a "filter" operation of fig. 6 in col. 10, lines 1-5 based on $activity_{EDGE}$ in col. 11, lines 43-50.).

Regarding claim 14, Vehvilainen discloses the method of claim 13 wherein the step of computing an the activity metric based on the input pixel window includes the steps of:

a) computing one of a level of variation of a red color plane ("red" signal in col. 5, line 9 is filtered according to the invention in col. 5, lines 8,9. Thus, the calculation of variance in col. 10, lines 44,45 is performed on the red signal.), a level of variation of a green color plane, a level of variation of a blue color plane, a level of variation of a luminance plane, a mean absolute deviation of a red color plane, a mean absolute deviation of a green color plane, a mean absolute deviation of a blue color plane, and a mean absolute deviation of a luminance plane.

Regarding claim 15, Vehvilainen discloses a method for processing a digital image having a plurality of input pixels comprising:

a) receiving the digital image (Fig. 5A is an image being received in fig. 6,num.60: START NEW FRAME.);

for each input pixel (The image of fig. 5A has a pixel represented as a black dot as shown in fig. 5A.) associated with the digital image (Fig. 5A is an image):

b) generating a level of variation (fig. 6,num. 64: CALC. VARIANCE ("SMOOTH") calculates a variance, $activity_{IN}$, of the pixels as shown in fig. 5A and in col. 11, line 43. Note that the subscript "IN" refers to the inner area, 51 of fig. 5A.) based on a first window of pixels (Fig. 5A,num. 51 is a window of pixels.) with reference to the input pixel (The image of fig. 5A has a pixel represented as black dot which has a variance calculated using each pixel of the window 51 of fig. 5A.);

c) determining (Fig. 6, num. 66:FILTERING uses the computed variance to determine to filter or not.) whether the level of variation (fig. 6,num. 64: CALC. VARIANCE ("SMOOTH") calculates a variance, $activity_{IN}$.) is in a predetermined relationship ($activity_{IN}$ is inserted into a predetermined relationship or comparison in equation (2) of column 9.) with a predetermined level of variation ($activity_{IN}$ is inserted into a predetermined relationship or comparison in equation (2) of column 9 with a predetermined level of variation or $THRESHOLD_{IN}$.);

d) when the level of variation ($activity_{IN}$) is in (When $activity_{IN}$ is less than $THRESHOLD_{IN}$, $activity_{IN}$.) the predetermined relationship ($activity_{IN}$ is inserted into a predetermined relationship or comparison in equation (2) of column 9.) with the predetermined level of variation ($THRESHOLD_{IN}$ in equation (2) of column 9.), applying a first filter (Fig. 6,num. 80: FILTER SMOOTHLY is applied if $activity_{IN}$ is less than $THRESHOLD_{IN}$); and

e) when the level of variation ($activity_{IN}$) is not in (When $activity_{IN}$ is greater than $THRESHOLD_{IN}$, $activity_{IN}$.) the predetermined relationship ($activity_{IN}$ is inserted into a predetermined relationship or comparison in equation (2) of column 9.) with the predetermined level of variation ($THRESHOLD_{IN}$ in equation (2) of column 9.), generating a measure of an edge parameter (Fig. 6,num. 68: CALC. VARIANCE ("MODERATE") calculates "$activity_{EDGE}$" in col. 11, lines 56-63.) based on a second window of pixels (Fig. 5A,num. 53 is a second window of pixels.) with reference to the input pixel (The image of fig. 5A has pixels represented as black dots as shown in fig. 5A.), selecting (fig. 6, num. 70: FILTERING? selects a filter or not.) an enhancement filter (fig. 6,num.82: FILTER MODERATELY) based on the measurement of the edge parameter ($activity_{EDGE}$), and applying the selected enhancement filter (fig. 6,num.82: FILTER MODERATELY) to a third window (The filter filters the pixel area 56 of fig. 5B.) to generate an output pixel (filtered pixel-) corresponding to the current input pixel (The image of fig. 5A has a pixel represented as a black dot which is now shown in fig. 5B.).

Regarding claim 16, (Original) The method of claim 15 wherein the second window (Fig. 5A,num. 53 is a second window of pixels.) includes a neighborhood of pixels (fig. 5A,num. 53 contains a group of pixels.) that includes the current input pixel (The image of fig. 5A has a pixel represented as a black dot where a variance is calculated for the "each" pixel in col. 10, lines 40,41.).

Regarding claim 17, Vehvilainen discloses the method of claim 15 wherein the first filter is a low pass filter as shown in the step 80 of figure 6 that replaces the current input pixel with a blurred version of the current input pixel as shown in fig. 3E where Block 1 and 2 have no definite border that divides block 1 and 2 as shown in fig. 3A as mentioned in col. 7, line 60 to col. 8, line 10.

Claims 19 is rejected the same as claim 3. Thus, argument similar to that presented above for claim 3 is equally applicable to claim 19.

Regarding claim 20, Vehvilainen discloses the method of claim 15 wherein the first window (fig. 5A, num. 51), the second window (fig. 5A, num. 53), and the third window (fig. 5B, num. 56) are the same window of pixels (The windows of figs. 5A,num. 51 and 53 and fig. 5B,num. 56 have a group of pixels that are common for all the windows.)

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vehvilainen (US Patent 6,504,873 B1) in view of Ghaderi (US Patent 5,481,628 A).

Claim 18 is similar to claim 15 except for the additional element of using the mean absolute deviation (MAD) for each respective step of claim 18. However, Vehvilainen does use a MQUANT probability measure, which suggests that an additional statistical measure can be used with the steps of claim 15, with activity measures $activity_{EDGE}$, and $activity_{IN}$.

However, Ghaderi teaches claim18 of a method wherein a step of generating a level of based on a first window of pixels with reference to an input pixel includes:

a) determining a mean absolute deviation (MAD) for color planes based on the first window of pixels; wherein the first window includes:

b) the input pixel (fig. 2,num. 26 is a central pixel.);

c) wherein a step of determining whether the level of variation ("The variation...level M_d ..." in col. 3, line 1) is in a predetermined relationship (Fig. 5,num.86: CLASSIFIER determines a class for a variation, M_d.) with a predetermined level of variation (The level or value of M_d shown in fig. 3 as the y-axis is compared with a predetermined level of variation, MD THR shown as a horizontal line on the right side of fig. 3.) includes comparing the MAD (M_d between numerals 84 and 86 is classified in num. 86:CLASSIFIER. Note that M_d is a "absolute mean deviation" in col. 3, lines 1-4.) with a predetermined threshold (M_d is compared with MD_THR, which is an activity threshold.);

d) wherein the step of when the level of variation ("The variation…level M_d…" in col. 3, line 1) is in a predetermined relationship (Fig. 5,num.86: CLASSIFIER determines for the variation, M_d, a "UNCERTAINTY LEVEL" classification relationship for M_d as shown in the SIGNAL portion in fig. 3) with the predetermined level of variation (The level or value of M_d shown in fig. 3 as the y-axis is compared with a predetermined level of variation, MD THR shown as a horizontal line on the right side of fig. 3. Thus if M_d, is less than MD THR, M_d is in the UNCERTAINTY LEVEL portion of figure 3.) includes when the MAD (M_d between numerals 84 and 86 is classified in num. 86:CLASSIFIER. Note that M_d is a "absolute mean deviation" in col. 3, lines 1-4.) is less than (If M_d, is less than MD THR, M_d is in the UNCERTAINTY LEVEL portion of figure 3.) the predetermined threshold (M_d is compared with MD_THR, which is an activity threshold.), applying a low pass filter (fig. 5 is an adaptive filter that includes a low-pass component in col. 12, line 65.) to the input pixel (fig. 2,num. 26 is a central pixel.) to generate an output pixel (fig. 5, label P_o is an output pixel.);

e) wherein the step of when the level of variation ("The variation...level M_d ..." in col. 3, line 1) is not in the predetermined relationship (Fig. 5,num.86: CLASSIFIER determines for the variation, M_d, a "UNCERTAINTY LEVEL" classification relationship for M_d as shown in fig. 3. If M_d is greater than MD THR line of figure 3, then M_d is not in the predetermined relationship of the "UNCERTAINTY LEVEL" portion of fig. 3.) with the predetermined level of variation (The level or value of M_d shown in fig. 3 as the y-axis is compared with a predetermined level of variation, MD THR shown as a horizontal line on the right side of fig. 3. Thus, if M_d is not less than MD THR, then M_d is classified as NO SIGNAL of fig. 3.) includes when the MAD (M_d between numerals 84 and 86 is classified in num. 86:CLASSIFIER. Note that M_d is a "absolute mean deviation" in col. 3, lines 1-4.) is not less than (If M_d is not less than MD THR, then M_d is classified as NO SIGNAL of fig. 3) the predetermined threshold (M_d is compared with MD_THR, which is an activity threshold.), selectively applying to a third window of pixels (Fig. 2,num. 26 is a pixel also considered as a window in col. 2, lines 54-56.) one set of filter coefficients (Fig. 5, label A_2 is a filter coefficient) selected from a group of sets of enhancement filter coefficients (Fig. 5, label A_1 is another filter coefficient.) based on at least one edge parameter (A window M_b

contains edges in col. 13, line 17.) computed (Window M_b computes an average that contains edges. Thus, M_b contains a computed edge parameter.) from a second window of pixels (fig. 5, label M_b is a second window as shown in figure 2.) to generate an output pixel (P_o is an output pixel corresponding to the pixel 26 of figure 2.)

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the MQUANT teaching of edge probability of Vehvilainen with Ghaderi's teaching of MAD, because Ghaderi's MAD is used to calculate an activity or variation for each window that provides a greatly enhanced...readability of the processed image (Ghaderi, col. 1 , lines 60-67)."

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario-Vasquez whose telephone number is 703-305-5431. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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